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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/065,331	10/04/2002	Pierino Bonanni	121601-1	2194
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6147	7590	06/29/2005
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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER

LE, JOHN H

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/065,331	BONANNI ET AL.	
	Examiner	Art Unit	
	John H. Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5, 7-24, 26 and 29-32 is/are allowed.
- 6) ☒ Claim(s) 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. This office action is in response to applicant's amendment received on 06/09/2005.

Claims 1, 5, 7, 11, 12, 23, 27, and 32 have been amended.

Claims 6 and 25 have been cancelled.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khalid (USP 6,231,306) in view of Orme et al. ("Flight Assessment of the Onboard Propulsion System Model for the Performance Seeking Control Algorithm on an F-15 Aircraft", NASA, July 1995).

Regarding claim 27, Khalid teaches a system for detecting precursors to compressor stall/surge 116 comprising at least one sensor 132 positioned at said compressor 116 to monitor at least one compressor parameter (e.g. Col.2, lines 59-65), said at least one sensor outputting raw data representative of said at least one compressor parameter (e.g. Figs.1, 2, Col.3, lines 6-26); a pre-filter to reject undesirable signals from said raw data (e.g. Fig.2, Col.3, lines 43-65), said pre-filter comprises a

Art Unit: 2863

band-pass filter (172) centered on a locally dominant component of the input signal (band-pass filter frequency input between 150Hz-180Hz, Col.3, lines 57-60).

Regarding claim 28, Khalid teaches said locally dominant component is tip-passage frequency of said compressor (e.g. Col.3, lines 57-66).

Khalid fails to teach a frequency demodulator receiving said raw data, demodulating said raw data, and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data.

Orme et al. teach a frequency demodulator (Performance Seeking Control PSC) receiving said raw data (pressure signal), demodulating said raw data, and producing demodulated data (e.g. Fig.2, Page 5); a Kalman filter obtaining stall precursors from said demodulated data (e.g. Fig.3, Page 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a frequency demodulator and a Kalman filter as taught by Orme et al. in a control system for preventing a compressor stall in a gas turbine engine of Khalid for purpose of providing improving the performance of an airplane (Orme et al., Page 3).

Allowable Subject Matter

4. Claims 1-5, 7-24, 26, 29-32 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, none of the prior art of record teaches or suggests the combination of a method for detecting precursors to compressor stall/surge, wherein the

Art Unit: 2863

method comprising steps of: monitoring at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; pre-processing said raw data using a frequency demodulator to produce pre-processed data comprising at least one demodulated signal having an amplitude corresponding to the instantaneous frequency of a locally dominant component of an input signal; post-processing said pre-processed data using a Kalman filter to obtain stall precursors. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 5, none of the prior art of record teaches or suggests the combination of a method for detecting precursors to compressor stall/surge, wherein the method comprising steps of: monitoring at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; wherein said monitoring comprises sampling and digitizing signals representing said at least one compressor parameter to obtain time-series analyzed data; pre-processing said raw data using a frequency demodulator to produce pre-processed data, said pre-processing being at least partially performed in the digital domain; post-processing said pre-processed data using a Kalman filter to obtain stall precursors.. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 11, none of the prior art of record teaches or suggests the combination of method for detecting precursors to compressor stall/surge, wherein the method comprising steps of: monitoring at least one compressor parameter to obtain raw data representative of said at least one compressor parameter; pre-processing said raw data using a frequency demodulator to produce pre-processed data, said preprocessing being performed at least partially in the analog domain, wherein said pre-processing comprises producing a demodulated signal having an amplitude corresponding to the instantaneous frequency of a locally dominant component of an input signal; and post-processing said pre-processed data using a Kalman filter to obtain stall precursors. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 23, none of the prior art of record teaches or suggests the combination of a system for detecting precursors to compressor stall/surge comprising: at least one sensor positioned at said compressor to monitor at least one compressor parameter, said at least one sensor outputting raw data representative of said at least one compressor parameter; a frequency demodulator receiving said raw data, demodulating said raw data, and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data; and a calibration system for sampling and digitizing output from said at least one sensor to obtain time-series analyzed raw data. said frequency demodulator receiving said time-series analyzed raw data. It is these limitations as they are claimed in the combination with other limitations of claim, which

Art Unit: 2863

have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 32, none of the prior art of record teaches or suggests the combination of a system for detecting precursors to compressor stall/surge comprising: at least one sensor positioned at said compressor to monitor at least one compressor parameters said at least one sensor outputting raw data representative of said at least one compressor parameter; a frequency demodulator receiving said raw data. demodulating said raw data and producing demodulated data; a Kalman filter obtaining stall precursors from said demodulated data; and a stall precursor measure system computing a standard deviation of innovations of said Kalman filter to determine a stall precursor signal. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Response to Arguments

5. Applicant's arguments filed 06/09/2005 have been fully considered but they are not persuasive.

--Applicant argues that the prior did not teach "a band-pass filter centered on a locally dominant component of the input signal".

Examiner position is that Khalid teaches a band-pass filter (172) centered on a locally dominant component of the input signal (band-pass filter frequency input between 150Hz-180Hz, Col.3, lines 57-60).

Contact Information

Art Unit: 2863

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275.

The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

June 25, 2005



MICHAEL NGHIEM
PRIMARY EXAMINER